



SMA LARGE SCALE ENERGY SOLUTIONS

Advanced Engineering Services

To simplify project completion





The right support is crucial

Working with the right partner is essential to ensure comprehensive support throughout the project life cycle

SMA offers sophisticated system solutions that are perfectly tailored to the needs of the most demanding energy requirements of tomorrow. These system solutions comprise a wide range of Engineering Services for plant owners, operators,

investors and developers. With these Engineering Services, SMA is leveraging engineering talent to address the challenges our customers face during project development and execution.

SMA Engineering Services focus on the early phases of the project

Development

Engineering

Construction

Operation



Working toward your goal

With our comprehensive approach, we concentrate on solutions to enable:



Grid compliance



Optimized solution



Smoother process



Faster completion times



One-stop shopping for engineering, hardware and service



Increased investment security



Full service for entire plant life cycle

Striving for simplification

SMA offers Advanced Engineering Services to reduce the complexity of the challenging requirements

SMA is a leader in developing technology, planning and design consultation as well as technical management of large-scale power plants. SMA provides service throughout the entire PV and BESS system life cycle, from engineering to hardware, operations and maintenance – everything from a single source.

Rely on more than 40 years of worldwide, proven SMA experience.

SMA experts support your projects when it comes to:

- Grid modelling
- Battery storage designs
- Battery interface integration
- Grid forming technology performance
- Control system assessment
- Factory integration tests

Grid Modelling

Flawless integration into all grid scenarios

Achieve grid code compliance for your large-scale power plant

When large-scale PV and storage projects are being developed and designed, a key topic in these processes is the complex power system studies required for integration of renewables to ensure safe and reliable operation. SMA Engineering Services offers:

- Support during preparation, negotiation, and final acceptance for grid modelling and system connection studies
- Vast experience from working closely with utilities across the globe (Australia, U.S., Germany, UK, etc.)
- RMS and EMT modeling experience with the commercial software DigSilent Power Factory, Siemens PSS/E, PSCAD, ASPEN, EMT-PC, and others

As a result, you will get:

- ✓ Higher quality of system studies (best performance)
- ✓ Smoother process from the specification and tender process to project
- ✓ Reduced risk through early adoption of a proper technical solution
- ✓ Project-specific performance optimization for challenging goals



Battery Storage Design

Simple battery energy storage solutions

Optimized battery sizing for your application

In large-scale storage systems it is crucial to optimize design elements during the development phase of the project. This helps to ensure financial feasibility and maximum profitability. SMA Engineering Services supports you in designing your Battery Energy Storage System (BESS) and in finding the right battery capacity for the project. We can simulate in detail the Energy Management System (EMS) and the output of the system in order to calculate its profits as well as the load profile for the battery degradation to assess the lifetime of the system.

Benefit from our extensive experience in designing your BESS for various applications:

- ✓ Microgrid management
- ✓ Grid services
- ✓ Renewable integration

Battery Interface Integration

Premium support in battery storage integration

Seamless integration of battery communication into the SMA solution environment.
Features and benefits:

- Access to the extensive list of tested and approved battery interfaces by SMA for direct communication and control
- Implementation of new battery interfaces upon request
- Optimal coordination: battery and inverter in direct communication
- Joint operation management
- Risk reduction: fully tested interfaces ensure battery communication compatibility during integration
- Scalability: less communication burden for the system controller
- Safety: the inverter knows the limitations of the battery, which is only connected when required
- Higher availability of the system due to fewer components and the possibility of continued operation if the plant controller fails

Grid Forming Technology Performance

Achieve grid stability

There is a growing need for stability solutions across the energy markets with a high share of renewables.

SMA can support studies including grid forming equipment, which is ideal for voltage and frequency stabilization in combination with power and energy applications.

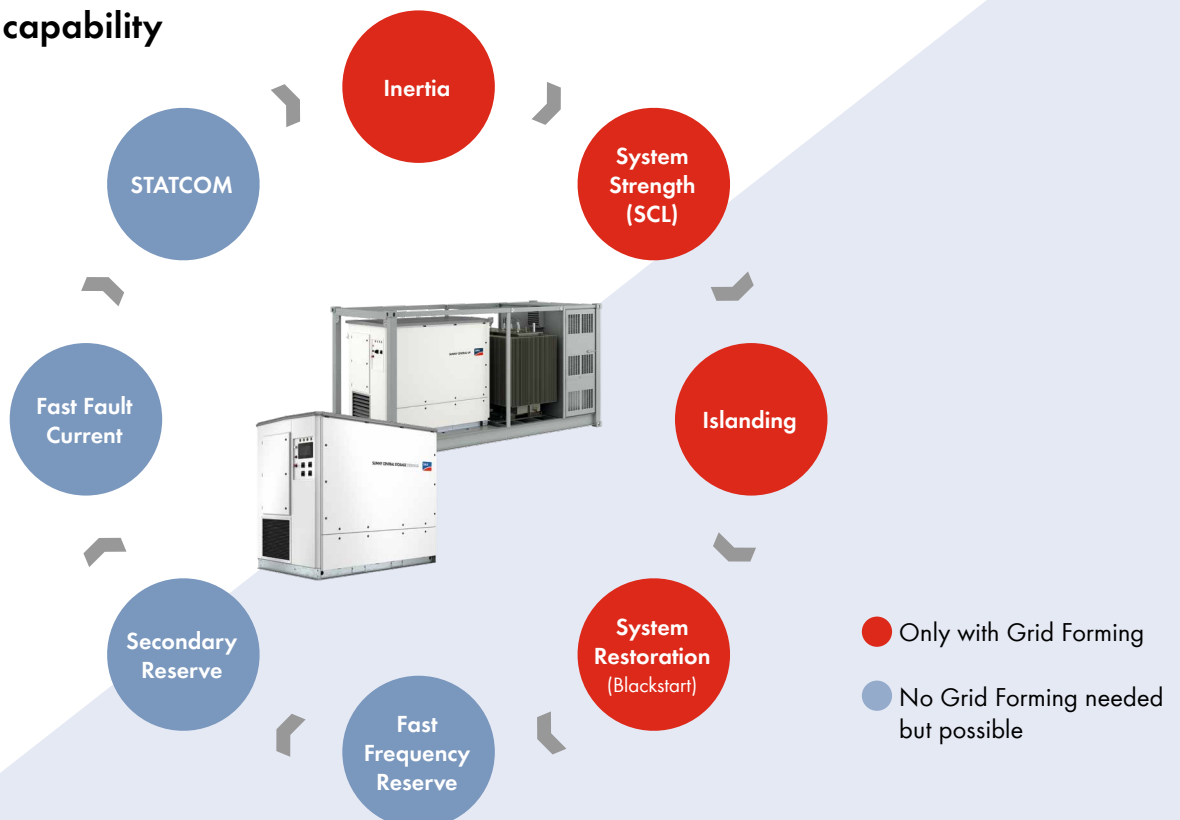
Advanced grid forming functions in inverters can substitute as well as improve on the existing technologies. The Engineering Services team has specialists for this novel technology who will help with designing the proper solution for the power plant.

Key features of our expert support for grid forming applications:

- Direct support during the initial engineering phases of the project ensures a superb outcome in terms of both quality and schedule.
- Answering questions from the different stakeholders: customers, consultants, transmission system operator (TSO), etc.
- Knowledge transfer sessions: ad-hoc workshops with the SMA grid forming experts
- Preferred access to SMA technical knowledge



Grid service capability





Control System Assessment

Advanced engineering support

The transformation of the energy system requires smart networked generation, storage and consumption. Advanced applications and control functions must be coordinated at the plant level.

Control system assessment

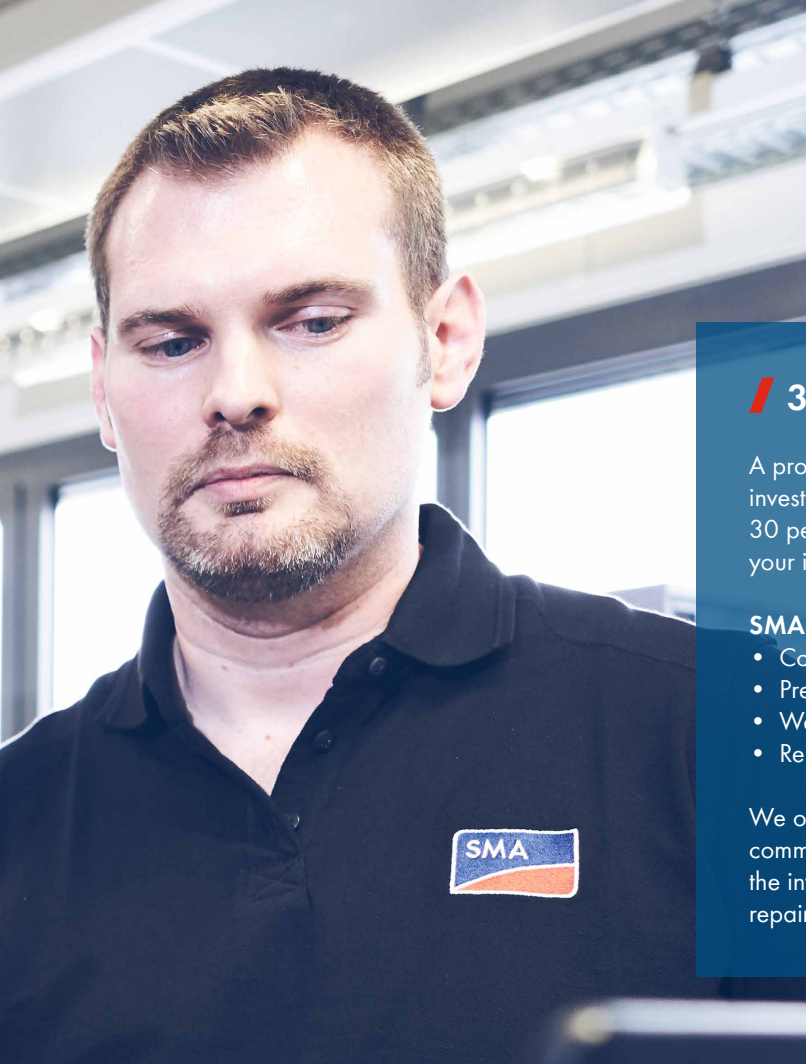
SMA Engineering Services offers support for designing, developing, commissioning and fine-tuning the SMA control system to ensure safe, efficient, and reliable operation of the power system. The goal is to define the functional operation of the SMA Control System together with other control devices and interfaces.

Protocol converter configuration

SMA Engineering Services offers the project-specific configuration according to the standard protocols available in the SMA Power Plant Manager: IEC 60870-5-101 / -104, IEC 61850, DNP3, Modbus RTU, and others.

Key features:

- Less effort
- One-stop solution
- Commissioning support from the expert engineers
- Faster problem solving



360° Service

A properly maintained solar system can accelerate investment payback and increase yields by up to 30 percent. Having a watchful and proactive eye on your investment is vital to ensuring maximum ROI.

SMA offers ideal service solutions:

- Commissioning support
- Preventive maintenance
- Warranty extensions
- Remote maintenance service

We offer you comprehensive support ranging from commissioning, preventive maintenance, and extending the inverter warranty to spare parts management and repairs.

Factory Integration Testing

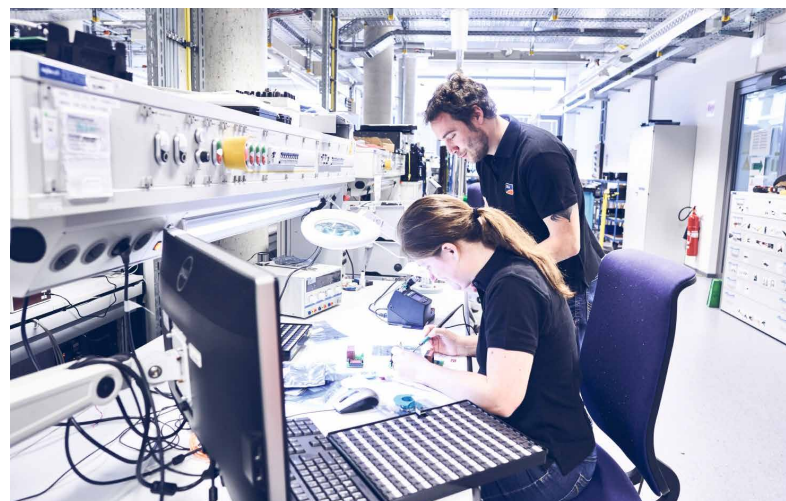
Be ready on-site

We offer system testing in our Test Center for successful project implementation, including testing communication interfaces for plant controllers, various applications and operation of the power plant, battery integration, and more.

Integration testing

- For solar PV, storage or hybrid systems (solar + storage)
- Various test labs available (with real hardware or hardware-in-the-loop simulation)
- Tests can be performed remotely
- Verification of control interfaces and operation modes (grid following, grid forming, etc.)

- ✓ Smoother process
- ✓ Risk reduction during commissioning
- ✓ Faster commissioning and plant connection
- ✓ Training, better understanding of the plant operation





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